

Range extension of *Oziothelphusa mineriyaensis* Bott, 1970 (Decapoda, Gecarcinucidae) in North Central Province, Sri Lanka

Heethaka Krishantha Sameera De Zoysa,¹ Dilum Prabath Samarasinghe,² Duminda S. B. Dissanayake,³ Supun Mindika Wellappuliarachi,⁴ Sriyani Wickramasinghe²

1 Rajarata University of Sri Lanka, Technology Degree Programmes, 50300, Mihintale, Sri Lanka. **2** Rajarata University of Sri Lanka, Department of Biological Sciences, 50300, Mihintale, Sri Lanka. **3** Institute for Applied Ecology, University of Canberra, ACT 2601, Australia. **4** Butterfly Conservation Society, 762/a, Yatihena, 11670, Malwana, Sri Lanka.

Corresponding author: H. K. S. De Zoysa, dezoysahks@yahoo.com

Abstract

The known distribution in Sri Lanka of the endemic freshwater crab *Oziothelphusa mineriyaensis* Bott, 1970 was limited to 2 known localities in the dry zone. In this study of the distribution of this species in the North Central Province of Sri Lanka, we identified 5 new localities. Our findings expand the extent of occurrence from 168 km² to 1467 km². Our new records are 62 km from the type locality and up to 89 km from the previous records in Anuradhapura District and 20 km from previous record in Polonnaruwa District. These data provide important new information needed for the conservation of this endangered species in Sri Lanka.

Key words

Dry zone; freshwater crab; Mihintale; distribution.

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Introduction

Freshwater crabs in Sri Lanka are one of the faunal groups with the highest rate of endemism, with 51 endemics of the 52 species (Bahir et al., 2005, Udagedera et al. 2015). Among these species, the genus *Oziotelphusa* Müller, 1887 is found mostly in open habitats in India and Sri Lanka. Ten of the 15 species of *Oziotelphusa* are endemic to Sri Lanka, and all of them are included in the IUCN Red List (Bahir et al. 2008, Bahir and Yeo 2005). The study by Bahir et al. (2005) reported 80% of the freshwater crab species to be restricted to wet zone (annual rainfall >2500 mm) with very limited distribution in the dry zone (annual rainfall <2000 mm). The North

Central Province, situated in the dry zone of Sri Lanka, harbours only 4 *Oziothelphusa* species (*O. ceylonensis* (Fernando, 1960), *O. hippocastanum* (Müller, 1887), *O. mineriyaensis* Bott, 1970, and *O. ritigala* Bahir & Yeo, 2005) of the 52 species on the island (Ng and Tay 2001).

Oziothelphusa mineriyaensis (Fig. 1) is a freshwater crab endemic to Sri Lanka. This species is typically found near rice fields, and on the embankments of water holes, streams, and irrigation canals (Bahir et al. 2005, Bahir and Yeo 2005). Morphologically, *O. mineriyaensis* is most similar to *O. ritigala* and *O. intuta* in its carapace characteristics, but the gonopods differ (Bahir and Yeo 2005).

The type locality of *O. mineriyaensis* is Minneriya

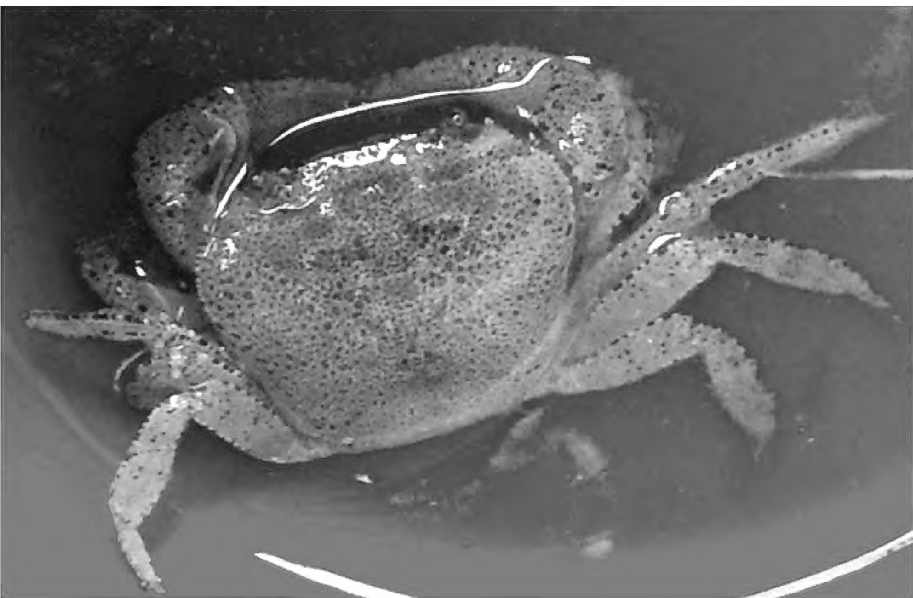


Figure 1. *Oziothelphusa mineriyaensis* male from Mihintale Sanctuary, North Central Province, Sri Lanka (SW/FC 021).

limited only to 2 location (Anuradhapura, North Central Province) other than the type locality (Ng and Tay 2001, Bahir and Yeo 2005, Bahir et al. 2008). Here, we report 5 new localities for *O. mineriyaensis* from the North Central Province of Sri Lanka, which add significantly to the known geographic distribution of this species. New records of endemic species, such as reported here, are important for biodiversity conservation.

Methods

The study was conducted in all areas, including both protected areas (established by the Sri Lanka Department of Wildlife Conservation) and unprotected areas (paddy fields, irrigation canals, and other open areas) of the North Central Province. This study was as a part of a survey, conducted from 2012 to 2014, to document the current distribution and diversity of the freshwater fauna in 2 districts (Anuradhapura and Polonnaruwa) of the North Central Province. The specimens were hand collected (*n* = 8) using the Rapid Surber sample method (Magana et al. 2012) and counts were taken using the visual encounter method (Patton 2010) in selected locations.

All the collected specimens were preserved in 70% isopropyl, given voucher numbers, and deposited at the zoological laboratory, Faculty of Applied Sciences, Raja-

rata University of Sri Lanka (Table 1). The Department of Wildlife Conservation in Sri Lanka gave permission for specimen collection under permit number WL/3/2/73/12 to 14. Locations were recorded using the Garmin GPS-MAP 64s GPS receiver (Garmin International, USA). Measurements of carapace width (CW), carapace length (CL), abdomen width (AW), propodus length (PL)/left (L), propodus height (PH)/L, propodus length (PL)/right (R) and propodus height (PH)/R (Table 1) were taken to the nearest 0.02 mm using a vernier caliper (Tricle Brand, Shanghai, China).

The previously published distribution records of *O. mineriyaensis* were taken from (Ng and Tay 2001), (Bahir and Yeo 2005), and Bahir et al. (2008) and used to prepare the distribution map (Fig. 2), along with our new records, using ArcGIS version 10.0 (ESRI, USA).

Results

The morphological identification (Fig. 3) of *O. mineriyaensis* was made based on (Ng and Tay, 2001) and (Bahir and Yeo 2005). This species was differentiated from the *O. ritigala* and *O. intuta* by the character of the male first gonopods (G1), which are distinctly broader terminally, box shaped in dorsal view, and with the outer margin of the lateral basal half of the G1 subterminal segment distinctly swollen in lateral view (Bahir and Yeo 2005). These distinctive characters, including other morphological characters, confirmed that our specimens were *O. mineriyaensis* (Fig. 3).

During this survey we recorded *O. mineriyaensis* at 5 new localities in the North Central Province: 51 individuals at seasonal streams, open areas, and forested areas of the Mihintale Sanctuary; 17 individuals at Galkulama under forest patches, 24 from paddy fields and irrigation canals from Eppawala; 13 individuals at Nochchiyagama from the paddy fields, slow moving seasonal streams, and the irrigation canals; and 6 individuals from irrigation canals at Polonnaruwa New Town (Table 1, Fig. 2). Eight individuals (4 males and 4 females) were examined to confirm the species identity, and 113 individuals of *O. mineriyaensis* were recorded in this study.

Table 1. Catalog numbers, locality, geographic coordinates, numbers of individuals (*N*), sex, and morphometric and meristic characters of *Oziothelphusa mineriyaensis*. The measurements indicated by CW = carapace width, CL= carapace length, AW = abdomen width, PL= propodus Length, PH = propodus height.

Catalog no.	Locality	Latitude (N)	Longitude (E)	N	Sex	Morphometric and meristic characters, ± 0.02mm						
						CW	CL	AW	PL/ left	PH/ left	PL/ right	PH/ right
SW/FC 021	Mihintale Sanctuary	08°21'09.8"	080°30'14.5"	51	M	41.70	33.30	8.70	26.60	10.80	32.30	19.60
SW/FC 023	Ritigala Strict Nature Reserve	08°07'09.9"	080°38'26.1"	2	F	25.50	19.90	13.80	12.50	4.90	12.60	4.80
SW/FC 024					M	22.00	17.80	6.30	11.50	4.60	9.90	4.30
SW/FC 043	Eppawala	08°08'40.6"	080°24'14.3"	24	M	35.78	28.00	9.22	26.60	12.16	22.32	8.00
SW/FC 044	Galkulama	08°16'08.8"	080°31'09.5"	17	M	34.14	26.70	11.66	0.00	0.00	20.50	8.18
SW/FC 060	Nochchiyagama	08°21'22.7"	080°09'23.3"	13	F	13.76	19.16	15.40	12.62	4.74	13.54	4.90
SW/FC 061					F	23.18	17.70	15.48	12.80	4.72	13.14	5.00
SW/FC 062	Polonnaruwa New Town Town	07°55'15.1"	081°00'39.9"	6	F	21.16	16.88	4.80	12.36	5.50	11.30	4.60

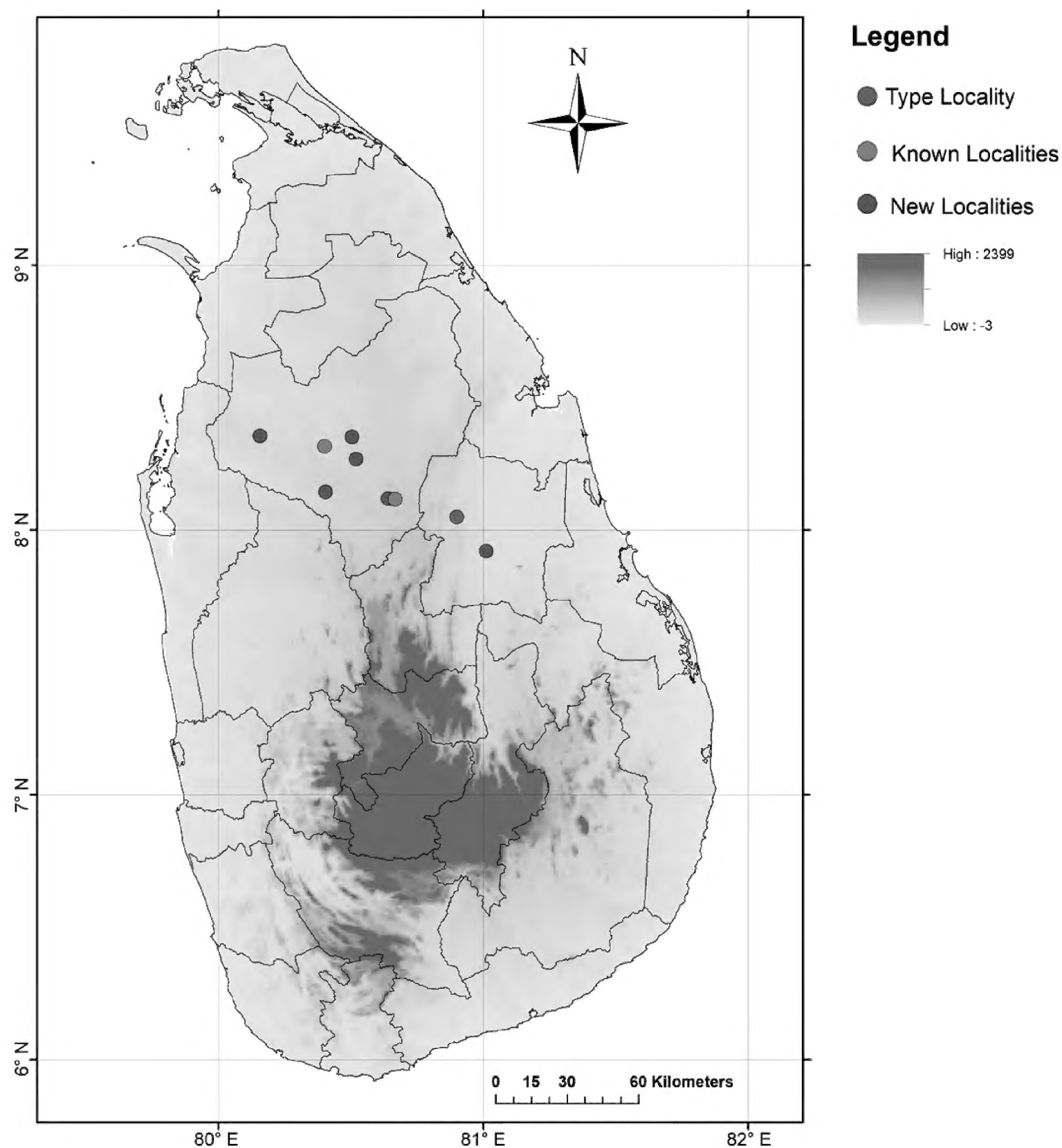


Figure 2. Distribution of *Oziothelphusa mineriyaensis*, with new localities in the North Central Province, Sri Lanka.

Discussion

Oziothelphusa mineriyaensis was first recorded only from 2 locations (Minneriya and Anuradhapura) and later 1 additional location was found (Ritigala) (Ng and Tay 2001, Bahir et al. 2005, 2008). During our survey we recorded this species at another 5 new localities in the North Central Province (Fig. 2). The habitats of new localities were all similar to habitats at previously known localities. Most of the new records came from fragmented forest patches with seasonal streams in the Anuradhapura and Polonnaruwa districts.

Based on the previous records, the extent of occurrence of the species was only 168 km². With the new records added, the extent of occurrence is now 1467 km² (Fig. 2). The new records are 62 km from the type locality and up to 89 km from the previous records in Anuradhapura District and 20 km from previous record in Polonnaruwa District.

Species with restricted distribution ranges and fragmented habitats are at a very high risk of becoming extinct in the wild (Bahir et al. 2008). New records of

endangered species are thus of uttermost importance to initiate conservation strategies. Therefore, our data provide critical information on the distribution of *O. mineriyaensis*, which would be helpful for planning and implementation of conservation efforts for the preservation of this endangered endemic species of crab.

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Authors' Contributions

HZ, DS, DD, SM and SW collected specimens and performed the fieldwork, HZ analysed the data, and HZ and SW wrote the text.

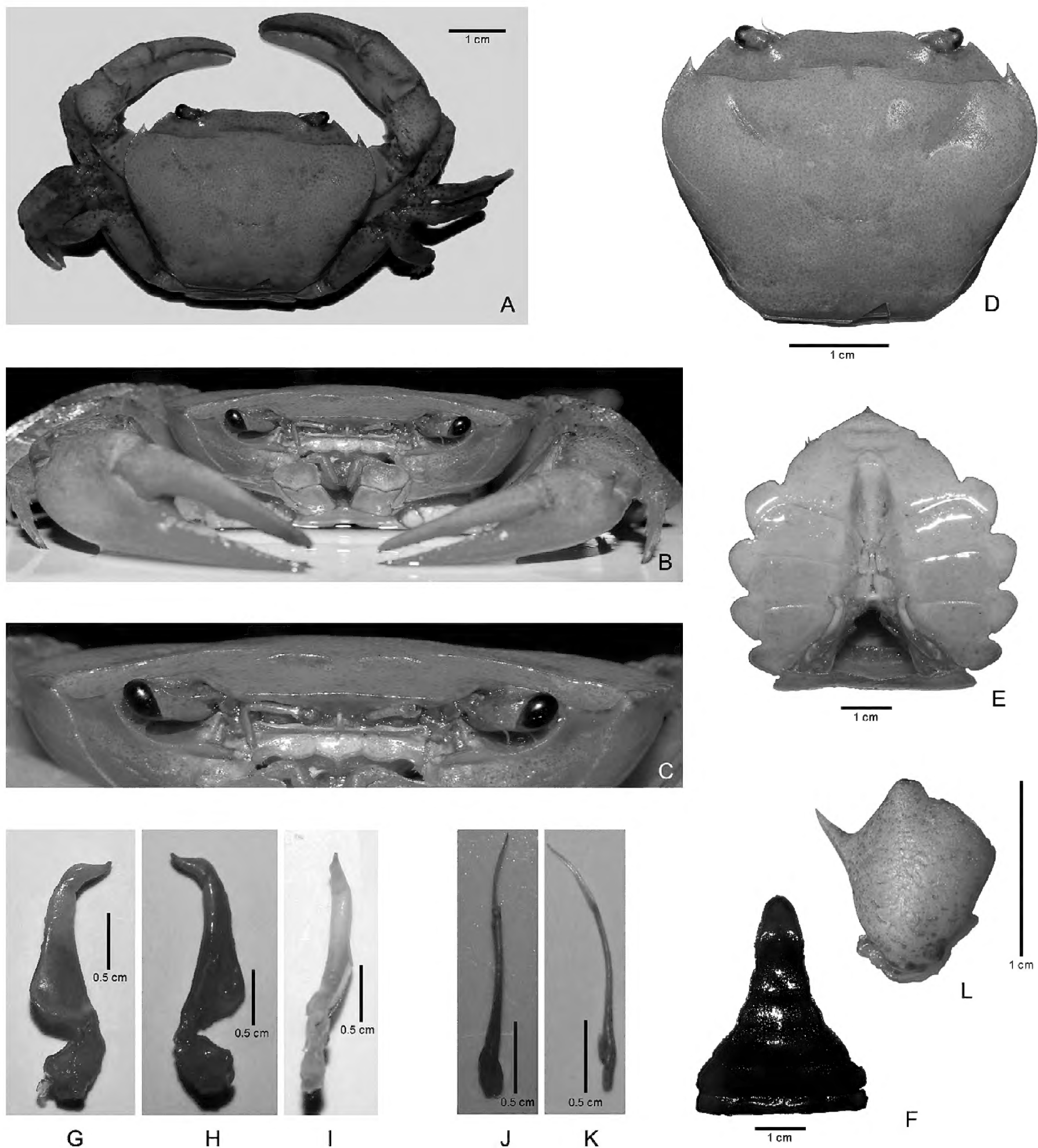


Figure 3. Morphological characters of *Oziothelphusa minneriyaensis*, male. **A.** Dorsal view. **B.** Anterior view. **C.** Episotomal median lobe and Frontal median triangle. **D.** Carapace dorsal view. **E.** Ventral view. **F.** Male abdomen. **G.** Right G1, dorsal view. **H.** Left G1, ventral view. **I.** Lateral view of left G1. **J.** Right G2, dorsal view. **K.** Left G2, ventral view. **L.** Left carpus found in Galkulama (SW/FC 044).

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